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January 4, 2013

Luly E. Massaro
Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

Re: Commission's Proceeding Relating to Stray and Contact Voltage Pursuant to Enacted Legislation
Docket No. 4237

Dear Ms. Massaro,

Enclosed herewith you will find an original and ten copies of the Power Survey Company Comments regarding National Grid's Designated Contact Voltage Program Report dated December 17, 2012, in the above matter. The same was e-mailed to the attached service list.

Very truly yours,

Joseph J. McGair, Esq.

JJM:dd
Enc.
HAND-DELIVERED

Docket No. 4237 – Commission's Proceeding Relating to Stray and Contact Voltage Pursuant to Enacted Legislation
Service List updated 10/1/12

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POWER SURVEY
COMPANY

January 4, 2013

Luly Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

Re: Docket 4237

Dear Ms Massaro,

As you are aware, on December 11, 2012, National Grid performed a contact voltage pilot survey. The results of that pilot were submitted to the commission in a December 17, 2012 filing. In summary, the field results were as follows:

- The survey covered approximately 12 linear miles of roadway[1]
- Over 200 alarms were registered and investigations were made[2]
- Only 2 contact voltage hazards were found
- Only one hazard was mitigated

These results raise several serious concerns:

- More than 99% of the alarms from the "detector" were false positives and did not yield any contact voltage finding
- The "detection rate" of the device was less than 1%
- On average, the "detection" device alarmed and stopped to perform a field investigation at least every 316 feet
- Premier found 97% fewer contact voltages than the 40-60 that National Grid anticipated finding during the test[3], highlighting the statistical insignificance of the pilot
- An unknown number of hazards were missed

The substantially lower than expected number of findings raises real concerns about the statistical basis for the design of the trial, as well as the performance of Premier and the vendor modified Narda device. Given the extremely low rate of detection, it is difficult to understand how National Grid could be satisfied with the results of this pilot or draw any positive conclusions from it.

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[1] National Grid - Summary of the RFP results, December 17, 2012, Section 2.0 Page 4 Line 1

[2] National Grid - Summary of the RFP results, December 17, 2012, Section 2.0 Page 4 Line 9, "Premier registered several hundred potential hits, which required stopping the test vehicle and manually testing all utility and third-party metallic objects within a 30 foot radius."

[3] RIPUC Hearing September 24, 2012, Page 89 Lines 9-11, Testimony of Mr. Cass "I'm thinking if we're looking at 40 to 50, maybe 60 hits"

POWER SURVEY COMPANY
25 Campus Drive Kearny, NJ 07032
P 888.772.2008 F 973.344.8577
www.powersurveyco.com

Despite claims to the contrary, Power Survey offered to assist National Grid in the design process and made numerous recommendations as to how the proposed pilot could be improved including those mentioned within our September 21, 2012 filing to the Commission[4]. These suggestions were largely ignored. Numerous attempts to discuss the basis for the trial were declined. During the December 4th bidder's conference call, National Grid could not answer simple questions about the test and evaluation process. In short, National Grid did not appear to treat the pilot seriously and Power Survey could not be party to a poorly organized evaluation.

Rochester, NY Benchmarking

Recognizing the desire for current benchmarking data, Power Survey commissioned independent testing laboratory, National Testing Systems "NTS", to monitor and document a mobile survey in the city of Rochester, New York using the SVD2000 system in December of 2012. Premier Utility Services also performed a survey of Rochester which concluded in December, 2012[5]. Comparing the results of both Power Survey and Premier's Rochester surveys provides a clear contrast between the two technologies.

The Rochester test area spanned 495 road miles and contained over 27,000 utility and municipally owned assets as well as other conductive surfaces along the scan route. Hundreds of contact voltage hazards were present.

In summary, the field results from Rochester were as follows:

- Premier identified fewer than 30 contact voltage findings, according to Rochester Gas and Electric
- Power Survey detected over 230 contact voltage hazards[6] in the same Rochester test area
- Premier started and finished their survey first, so any hazards found were mitigated and unavailable for discovery by Power Survey
- Premier failed to detect the overwhelming majority of contact voltage hazards in Rochester, including items energized with full line voltage.

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[4] Public Comment by Power Survey (http://www.ripuc.org/eventsactions/docket/4237-PublicComment-PowerSurvey2.pdf)

[5] National Grid - Summary of the RFP results, December 17, 2012, Section 2.0 Page 6, Footnote 3, "Since the Commission's Order, the Company took note that Rochester Gas and Electric Company in New York has also utilized Premier for its mobile surveying and testing."

[6] A contact voltage hazard is defined by the New York Commission as a more than 1 volt measured with a 500 ohm shunt resistor to a validated ground.

POWER SURVEY
COMPANY

Attached please find the Rochester Benchmarking Report authored by National Testing Systems "NTS" of Boxborough, MA. This report details the voltages, locations and a photo of each energized structure as measured by NTS. It is worth noting that NTS Boxborough is the same independent testing laboratory that performed the 2012 certification of Premier's mobile detection system.

NTS' Rochester Benchmarking Report provides the Commission with a critical missing link in the selection of technology capable of reliably detecting contact voltage hazards. Please don't hesitate to contact me with any questions.

Sincerely,

Angelo Verdoni, PhD.
Sr. Member Technical Staff

Enc.
Test Report No. TR-PR019987-12E, Rev 1 Contact Voltage Benchmarking - Rochester NY

POWER SURVEY COMPANY
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P 888.772.2008 F 973.344.8577
www.powersurveyco.com

Test Report No. TR-PR019987-12E, Rev 1
Contact Voltage Benchmarking - Rochester NY

Prepared For: Power Survey Company
25 Campus Dr.
Kearny, NJ 07032
P.O. Number: 600

Prepared By: National Technical Systems
1146 Massachusetts Avenue
Boxborough, MA 01719
(978) 266-1001
www.ntscorp.com

Issued: January 3, 2012

ACCREDITED
TESTING CERT. NO.
214.14 - 214.15

Revision Page

Rev	Date	Description
0	January 3, 2013	Original
1	January 3, 2013	Updated Appendix reference

Signatures

Prepared by: _____
Elizabeth Furtado, Technical Writer

Approved by: _____
Clayton Forbes, Program Engineer

Reviewed by: _____
Michael McCouch, NTS Quality Representative

Table of Contents

1.0 Purpose

This report presents the test procedures used and the results obtained during the performance of an Environmental test program. The test program was conducted to assess the ability of 258 Energized Objects to successfully satisfy the requirements specified in the references listed in Section 2.0 of this report.

2.0 References

- Power Survey Company Purchase Order No. 600 dated December 21, 2012
- NTS Quotation No. OP0129113 dated January 2, 2013
- ISO/IEC 17025:2005(E), General Requirements for the Competence of Testing and Calibration Laboratories, May 15, 2005
- This method is described by the IEEE working group on stray voltage. The website for the group is: http://grouper.ieee.org/groups/td/dist/stray/
- The grounding procedure is described in section 6.5 of the following document: http://grouper.ieee.org/groups/td/dist/stray/files/Draft_of_Clause6-ContactVoltage_July2011.pdf

3.0 Test Items

3.2 Security Classification

Unclassified

4.0 Test Date, Locations, and Equipment

4.1 Test Dates

Test	Technician	Dates
Voltage Measurements Variance, Rochester NY	Bryan Moore	December 26-28, 2012

4.2 Test Equipment

A list of the test equipment used for the test is included in this report. This equipment is calibrated according to ISO/IEC 17025:2005(E) and calibration is traceable to the National Institute of Standards and Technology (NIST). Calibration records are maintained on file at National Technical Systems.

5.0 Test Descriptions and Results

- All testing was performed in accordance with Section 2.0 of this test report.

5.2 Voltage Measurements Variance Test

Background

Power Survey Company operates contact voltage detection equipment for the purpose of locating energized structures and surfaces in the public landscape. Over the period of 12/5/2012 through 12/24/2012, Power Survey Company performed a survey of the electrical distribution system in Rochester NY. The test consisted of driving a vehicle equipped with an SVD2000 detection system along the streets in search of energized objects and surfaces. When the SVD2000 signaled the presence of a potentially energized object, the truck was stopped and technicians made voltage measurements on the energized object. Over the course of the test, 258 objects were measured with varied voltage levels present. This sweep covered approximately 495 road miles.

Following the completion of the scan of Rochester, Power Survey Company contracted National Technical Systems (NTS), Boxborough, MA, to verify the presence and measure the level of voltage on each of the 258 energized sites The test required a technician from NTS to travel to Rochester and use NTS supplied, NIST traceable, test equipment to measure voltage on each object identified by Power Survey. NTS performed this testing over the period of 12/26/2012 through 12/30/2012. The results are presented in this report.

Measurement Procedure

For each location previously identified by Power Survey a NTS Technician traveled to the location in the SVD-2000 with a Power Survey Technician. The NTS Technician observed the Power Survey technician operating the SVD2000 equipment and performing the detection of energized objects.
Upon arrival at each location the NTS Technician performed AC voltage measurements as detailed below. The voltmeter was connected to the energized object and to different ground points. Voltage readings were recorded at each energized object. Voltage measurements were taken both with and without a 500 Ohm shunt connected across the input terminals of the voltmeter.

Reading were taken from two different ground points, the first was a ground point that was within 8 feet of the energized object, this is referred to as distance based grounding. The second ground point was selected by Power Survey using the procedures outlined in IEEE P-1695 Section 6; this is referred to as the IEEE Ground. Voltage measurements were made with and without the shunt resistor at each of the ground points.

Ground point selection

Distance Based Grounding Procedure

This ground point was established by driving a ground rod into the soil nearby the object where voltage was detected. The ground rod was inserted into the soil approximately 6 to 8 feet away from the energized object. The only limitation in selecting the ground was that the ground point was within 8 feet of the energized object. In cases were no soil was available to insert a ground rod within 8 feet a metallic object such as a street sign was used. If neither existed within 8 feet only the IEEE method was used and the condition was noted on the datasheet.

IEEE Ground

This ground point was established through a verification process intended to ensure the ground point was at zero potential and had low impedance to earth. Possible ground points included nearby fire hydrants, storm drains, street signs, manhole covers and driven ground rods (same type used in distance based grounding procedure.) For each IEEE ground location the following processes was followed:

- A nearby candidate ground point was selected
- A handheld electric field meter was used to verify **absence** of electric field on the candidate ground point, indicating that the ground point is not energized
- A voltage measurement was made without the shunt resistor in the circuit
- A voltage measurement was made with the shunt resistor in the circuit. If a large voltage drop was observed by when the shunt was applied, indicating a high impedance ground point, a new candidate ground was selected and the process repeated
- Once a verified ground was obtained, the voltage measurements with, and without shunt resistor were recorded

A total of four measurements were made at each location and recorded on the attached datasheet

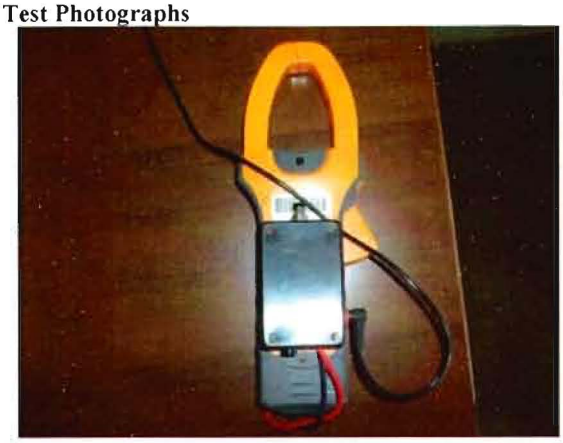
- Voltage without shunt using 6-8 ft. ground.
- Voltage with shunt using 6-8 ft. ground.
- Voltage without shunt using IEEE ground.
- Voltage with shunt using IEEE ground.

At each location a photograph of the energized object and the 6-8 foot ground were taken and are contained in this report.

Observations
Each of the 258 supplied locations was visited and measurements were performed. It was observed that voltages recorded using the distance based grounding method were often lower than those recorded using the IEEE method. In some cases, the ground rod inserted using the 6-8 ft. method was itself energized as shown by indications on the handheld electric field meter. Since all voltmeters measure the difference in voltage between the two leads this results in artificially low voltages. These measurements do not accurately capture the full voltage present on the energized object. The ground point in the IEEE method was screened to eliminate energized grounds leading to greater measurement accuracy.

Results
A total of 258 energized objects were measured in Rochester NY. The highest voltage recorded was 112 volts.

Test Photographs



500 Ohm test box

500 Ohm Verification

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

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Photo 13

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Photo 16

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Photo 18

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Photo 22

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Photo 27

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Photo 110

Photo 112

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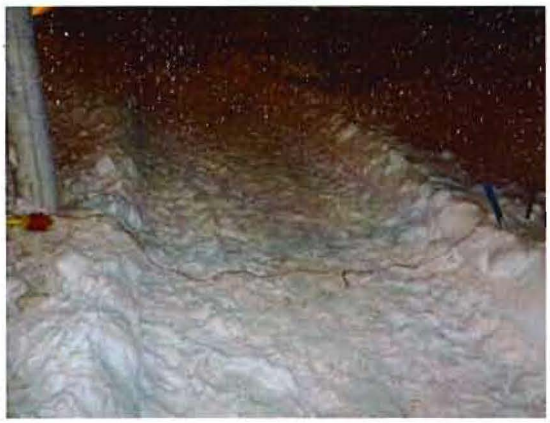

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Photo 147

Photo 148

Photo 149

Photo 150

Photo 151

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Photo 153

Photo 154

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Photo 156

Photo 157

Photo 158

Photo 159

Photo 160

Photo 161

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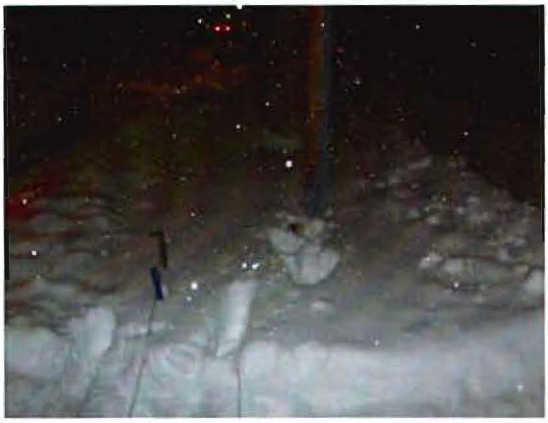

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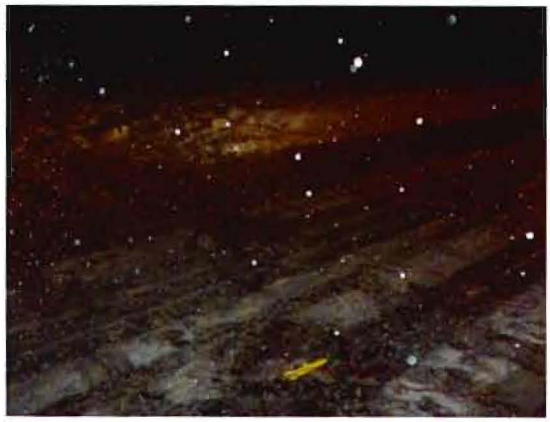

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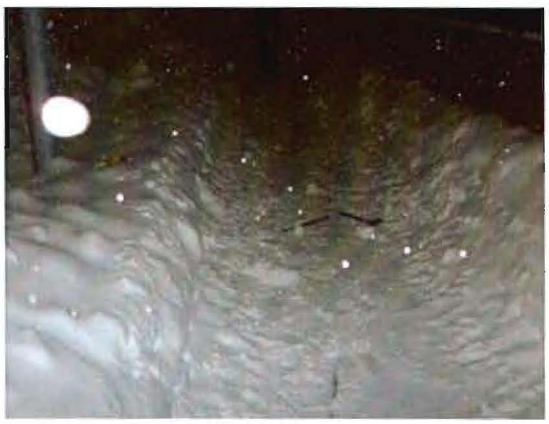

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Photo 215

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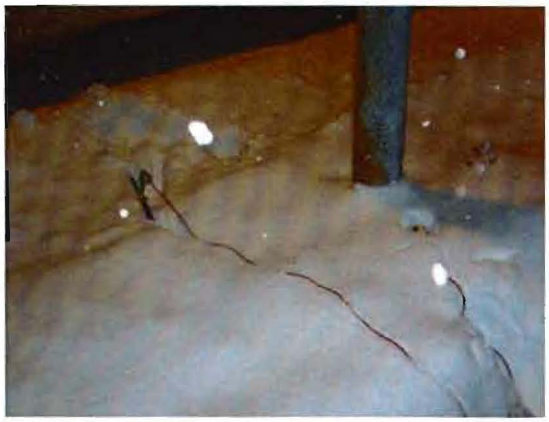

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Photo 249

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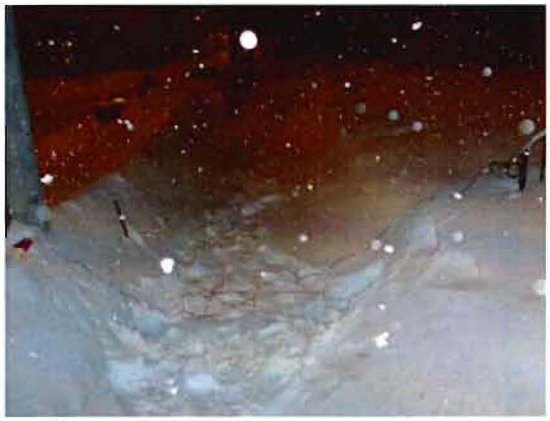

Photo 253

Photo 254

Photo 255

Test Data

Date/Time	Event ID	Structure	Structure ID	Voltage	V Shunt	Voltage	V Shunt	Address	Cross Street	Photo #
27-Dec										
6:30	99	Traffic Control Box	140	10.1	9	5.8	1.3	Genesee St -NEC	Brooks Ave	1
6:35	100	Traffic Light	140	10.1	8.8	5.6	1.2	Genesee St -NEC	Brooks Ave	2
6:37	56	Traffic Light	142A	10.9	10.4	9.4	4.2	Genesee St -SEC	Brooks Ave	3
6:39	54	Street Light	143	10.1	9.3	9.5	7.9	Genesee St	Brooks Ave	4
6:41	55	Street Light Pedestrian Crossing	6	10.6	9.3	10.2	4.3	Brooks Ave-NWC	Genesee St	5
6:43	60	Street Light	19	4.1	3.6	3.8	2.2	141 Arnett BLVD	Genesee St	6
7:00	11	Street Light	118	6.1	2.5	6.1	2.5	Plymouth Ave	Elmwood Ave	7,8,9
7:05	12	Street Light	16	7.2	4.1	6.6	3.3	South Plymouth Ave	Elmwood Ave	10
7:15	13	Street Light	114	8.1	4.3	7.6	4.6	South Plymouth Ave	Elmwood Ave	11
7:20	14	Street Light	112	8.1	4.5	7.8	3.2	Plymouth Ave	Elmwood Ave	12
7:25	15	Street Light	n/a	8.8	3.9	7.9	4.9	South Plymouth Ave	Elmwood Ave	13
7:28	16	Street Light	113	5	4	4.3	2.4	Plymouth Ave	Elmwood Ave	14
7:31	17	Street Light	115	7.8	6.6	7.6	3.4	Plymouth Ave	Elmwood Ave	15
7:36	18	Strett Light	117	6.6	4.2	5.5	3	Plymouth Ave	Elmwood Ave	16
7:40	19	Street Light	119	6.3	3.8	6	3.9	Plymouth Ave	Elmwood Ave	17
7:45	93	Street Light	12R	4.6	2.5	4.1	2	Plymouth Ave	Elmwood Ave	18
7:55	10	Traffic Light	170R	3.5	1.7	3.2	2	Plymouth Ave	Elmwood Ave	19
8:09	1	Street Light	23	0.8	0.6	0.7	0.4	OPP 296 Flint St	Costello Park	20
8:15	1	Street Light	24	0.9	0.41	0.9	0.4	304 Flint St	Costello Park	21
8:30	8	Street light	12	4.7	3.3	3.7	2	Moran St	Ardmore St	22
8:35	4	Street Light	10	4.5	3.5	3.7	2	Ardmore St	Moran St	23
8:39	3	Street Light	9	4.9	4.7	4.2	2.7	81 Ardmore St	Moran St	24
8:42	57	Street Light	8	3.9	2.4	3.3	2.2	OPP 69 Ardmore ST	Moran St	25
8:55	6	Street Light	101	3.8	2.6	3.5	1.7	Genesee ST	W High Terrace St	26
8:57	5	Street Light	2R	4.6	3.3	4	2.8	W High Terrace	Genesee St	27
9:06	7	Street Light	152	7.9	7.3	7	5.9	1030 Genesee	Park Terrace	28
9:13	9	Street Light	151	11.1	8.9	No Grass	No Grass	1009 Genesee St	Brooks Ave	29
10:20	53	Street Light	53	2.3	1.8	2.3	1.9	OPP 700 Brooks Ave	Genesee park BLVD	30
10:30	58	Street Light	n/a	3.8	3.7	3.2	2.1	291 Arnett BLVD	Wellington AVE	31
10:37	59	Street Light	23	3	2.3	2.7	2.1	185 Arnett BLVD	Kenwood AVE	32
10:45	62	Street Light	20	3.8	3.6	3.5	2.4	OPP 169 Arnett BLVD	Kenwood AVE	33
10:50	63	Street Light	34	3.7	2.3	3.5	2.3	OPP 303 Arnett BLVD	Wellington AVE	34
11:02	64	Street Light	92	13.3	8.5	12.5	7.4	OPP 1039 Arnett BLVD	Westfield St	35
11:07	65	Street Light	93	13.5	11.4	12.8	9	OPP 1046 Arnett BLVD	Westfield St	36
11:12	66	Street Sign	X	2.1	1.3	Hot Ground	Hot Ground	1046 Arnett BLVD	Westfield St	37
11:30	67	Street Light	8R	17	16.5	15.3	13.5	Buffalo RD	Glide St	38
11:57	20	Street Light	89	3.3	2.9	2.9	2.5	737 E Main St	Alexander St	39
12:05	21	Street Light	91	4.2	1.9	3.8	2.7	E Main St	Alexander St	40

Date/Time	Event ID	Structure	Structure ID	Voltage	V Shunt	Voltage	V Shunt	Address	Cross Street	Photo #
12:09	22	Street Light	95	5	4.4	4.9	1.6	795 E Main St	Alexander St	41
12:14	23	Street Light	97	5.2	4.9	5.1	3.3	835 E Main St	Prince St	42
12:33	26	Street Light	128	0.9	0.5	No Grass	No Grass	570 West Main St	Jefferson Ave	43
12:33	25	Street Light	138	0.8	0.4	0.8	0.4	570 West Main St	Madison St	44
12:44	32	Street Light	1	0.9	0.3	0.9	0.3	5 Madison St	Yack Ally	45
12:59	107	Street Light	4	51	46	45.5	31	66 Champlaibn St	Olean St	46
1:03	28	Street Light	5	3.7	2.9	1.3	0.9	79 Champlain St	Olean St	47
1:05	29	Access Hatch	X	5.2	2.3	1.5	0.6	79 Champlain St	Olean St	48
1:11	30	Street Light	6	52.2	51.3	44	26	94 Champlain St	Seward St	49
1:36	31	Street Light	4	17.3	8.6	11.6	5.6	Tracy St	Alexander St	50
1:50	34	Street Light	n/a	1.2	1	1.2	0.8	603 Park Ave	Vassar St	51
1:54	33	Ped X-Ing	n/a	3.7	3.3	1.8	1.1	OPP 603 Park Ave	Vassar St	52
2:21	61	Street Light	29	1.8	1.6	1.8	1.3	OPP 440 Genesee St	Aldine St	53
2:34	84	Street Light	29	2.4	2	2.2	1.9	Elmwood Ave	Lattimore RD	54
2:40	85	Street Light	35	1.9	1.8	1.6	1.3	Elmwood Ave	Lattimore RD	55
2:45	86	Street Light	45	2.4	1.9	2.3	1.5	Elmwood Ave	Thomas H Jackson Dr	56
2:51	87	Street Light	51R	2	1.7	1.7	1	Elmwood Ave	Thomas H Jackson Dr	57
2:55	88	Street Light	57	1.7	1.7	1.7	1.7	Elmwood Ave	East DR	58
3:04	89	Street Light	58	2	1	1.9	1	Elmwood Ave	East DR	59
3:10	90	Street Light	63	111.5	91	98.9	81.5	Elmwood Ave	MT hope Ave	60
3:13	91	Manhole	X	11.7	1.1	6.6	1.8	Elmwood Ave	MT hope Ave	61
3:26	68	Street Light	5	3.7	1.7	3.7	2	Lilac DR	Highland Ave	62
3:31	69	Street Light	7	4.4	3.1	4.3	2.3	Lilac DR	Highland Ave	63
3:40	70	Street light	11	4	1.6	3.9	1.8	OPP 28 Lilac DR	Highland Ave	64
3:46	71	Street Light	13	3.5	2.1	3.4	1.9	Lilac DR	Highland Ave	65
4:30	72	Traffic Control Box	n/a	16.4	14.7	16.4	14.7	Meigs St-NEC	Monroe Ave	66
4:34	73	Traffic Signal	n/a	16.8	14.4	16.8	14.4	Meigs St-NEC	Monroe Ave	67
4:35	74	Access Hatch	n/a ried in snow			X ıried in snow	X	Meigs St-NEC	Monroe Ave	X
4:51	75	Street Sign	n/a	18.6	11.4	18.6	11.4	109 S. Union St	Ballou PL	68
4:52	76	Sign	n/a	19.2	11.9	19.2	11.9	109 S. Union St	Ballou PL	69
4:53	77	Guard Rail	n/a	10.6	7.6	10.6	7.6	109 S. Union St	Ballou PL	70
4:54	78	Guard Rail	n/a	11.8	8.1	11.8	8.1	109 S. Union St	Ballou PL	71
4:55	79	Manhole	n/a	2.5	1.7	2.5	1.7	109 S. Union St	Ballou PL	72
5:20	80	Street Light	61	1	0.6	1.1	0.5	OPP 374 Alexander St	Parker Ally	73
5:34	81	Ped X-Ing	32	0.3	0.1	0.3	0.1	OPP 235 Alexander St	Tracy St	74
5:40	83	Street Light	40	3.2	2.1	3.2	2.1	OPP 219 Alexander St	Bixby PL	75
5:49	82	Street Light	32	1.1	0.9	1.1	0.9	172 Alexander St	Monroe Ave	76

Date/Time	Event ID	Structure	Structure ID	Voltage	V Shunt	Voltage	V Shunt	Address	Cross Street	Photo #
28-Dec										
7:11	92	Street Light	62	2.8	2.1	2.8	2.1	S. Goodman St	Henrietta St	77
7:28	94	Street Light	4	3.5	3.4	3.3	2.5	Arvine Park	Genesee St	78
7:41	96	Street Light	56	2.2	2	2.2	1.8	Elmwood Ave-NEC	East DR	79
7:49	101	Street Light	8	2.4	1.5	2.5	1.5	Genesee St	Columbia Ave	80
7:59	101	Street Light	18	4.5	3.2	4.5	3.2	224 Shelter St	Genesee St	81
8:02	103	Street light	16	2.3	2.2	2.1	1.1	204 Earl St	Genesee St	82
8:10	104	Street Light	6	2.3	1.8	2.1	1.2	76 Stratford Park	Genesee St	83
8:14	105	Street Light	5	3	3	2.6	1.1	OPP 60 Elgin St	Stratford Park	84
8:35	108	Street Light	n/a	1.3	1.3	1.3	1.3	E Broad St	Savannah St	85
8:42	109	Street Light	43	1.9	1.3	1.9	0.6	N Chestnut St	Stillison St	86
8:50	110	Street Light	18	34.5	32.3	31.5	11.9	South Ave	Court St	87
8:54	111	Manhole	n/a	5.7	3.1	4.7	1.3	South Ave	Court St	88
9:03	112	Traffic Light	6	57.3	32.3	57.1	41.5	44 Exchange BLVD-NEC	Bank PL	89
9:07	113	Manhole	n/a	6	1.9	5.7	1.3	44 Exchange BLVD-NEC	Bank PL	90
9:14	115	Metal Fence	n/a	4.2	2.1	4.2	2.1	Andrews St	Front St	91
9:16	114	Street Light	n/a	14.9	12.1	14.9	12.1	Andrews St	Front St	92
9:35	117	Traffic Control Box	n/a	10.2	8.6	6.9	1.8	State St-NWC	Allen St	93
9:38	116	Traffic Signal	25	9.7	8.1	9.7	8.1	State St-NWC	Allen St	94
9:50	119	Fence Plate	n/a	2.8	1.8	2.8	1.8	Fitzhugh St	Broad St	95
10:51	125	Street Light	12	4	3.9	4	3.9	10 Manhattan SQ DR	Court St	96
10:53	124	Street Light	13	3.8	3.8	3.8	3.8	10 Manhattan SQ DR	Court St	97
10:55	123	Street Light	14	3.6	2.8	3.6	2.8	10 Manhattan SQ DR	Court St	98
10:57	122	Street Light	15	3.4	3.4	3.4	3.4	10 Manhattan SQ DR	Court St	99
11:00	121	Street Light	n/a	3	2.3	3	2.3	10 Manhattan SQ DR	Court St	100
11:05	120	Street Light	n/a	2.4	1.8	2.4	1.8	10 Manhattan SQ DR	Court St	101
11:09	126	Street Light	n/a	4.1	4	4.1	2.1	OPP 10 Manhattan SQ DR	Court St	102
11:13	127	Street Light	10	4.3	4.1	4.3	4.1	10 Manhattan SQ DR	Woodbury BLVD	103
11:16	128	Street Light	9	3.7	1.6	3.7	1.6	10 Manhattan SQ DR	Woodbury BLVD	104
11:20	129	Street Light	8	4.3	3.6	4.3	3.6	10 Manhattan SQ DR	Woodbury BLVD	105
11:25	130	Street Light	7	4.3	3.5	4.3	3.5	10 Manhattan SQ DR	Woodbury BLVD	106
11:41	131	Street Light	n/a	4.1	3.3	4.1	3.3	Ford St	S. Plymouth Ave	107
12:07	136	Street Light	30	4.4	4.4	3.5	1.5	400 Westminster RD	Canterbury RD	108
12:16	137	Street Light	28	3.2	2	3.2	2	370 Westminster RD	Canterbury RD	109
12:12	134	Street Light	31	4.3	2.6	4.3	2.6	417 Westminister RD	Canterbury RD	110
12:26	135	Street Light	6	5	3.9	4.7	2.2	OPP 55 Canterbury RD	Westminster RD	111
12:19	138	Street Light	26	4.2	1.2	4.2	1.2	360 Westminster RD	Canterbury RD	112
12:40	27B	Street Light	33	26.6	14.8	23.5	8.8	345 S Plymouth AVE	Exchange BLVD	113
1:07	113	Street Light	113	12.8	8.5	12.8	8.5	1345 Park Ave	East DR	115
1:10	36	Street Light	112	14.1	13.7	11.5	5.9	OPP 1345 Park Ave	East DR	116

Date/Time	Event ID	Structure	Structure ID	Voltage	V Shunt	Voltage	V Shunt	Address	Cross Street	Photo #
1:13	37	Street light	111	12.6	9.1	12.6	9.1	1317 Park Ave	East DR	117
1:19	132	Traffic Camera	n/a	2	1.4	2	1.4	East Ave	Culver RD	118
1:30	133	Street Light	10	2.1	1.1	2.3	1.7	Corwin RD	Ramsey Park	119
1:45	139	Street Light	42	2.7	2.1	2.2	1.9	OPP 315 Culver RD	Sager DR	120
1:50	140	Street Light	17	3.7	2.1	3.4	2.6	Atlantic Ave	Anderson Ave	121
1:57	141	Street Light	n/a	3.6	2.2	3.6	2.2	Atlantic Ave	Russell St	122
2:00	143	Street Light	20	2.1	2	1.8	1.2	Atlantic Ave	Russell St	123
2:05	142	Street Light	21	5.2	4.9	5.1	3.8	Atlantic Ave	Russell St	124
2:30	106	Street Light	106	1.9	1.7	1.9	1.7	1274 Dewey Ave	Magee Ave	125
2:33	39	Street Light	105	0.9	0.3	1	0.4	Dewey Ave	Seneca PKWY	126
2:54	146	Street Light	61R	7.6	5.4	6.9	4.8	525 Lyell Ave	Austin St	127
3:00	145	Street Light	63R	8.3	6.7	No Grass	No Grass	531 Lyell Ave	Mart PL	128
3:04	144	Street Light	67R	4.7	4.5	4.6	2.5	531 Lyell Ave	Mart PL	129
3:10	150	Street Light	72R	5.1	4	5.1	4	568 Lyell Ave	Rutter St	130
3:14	149	Street Light	58R	2.8	2.2	2.8	2.2	512 Lyell Ave	Calihan Park	131
3:16	148	Traffic Camera	n/a	2.3	2.1	2.3	2.1	512 Lyell Ave	Calihan Park	132
3:22	147	Street Light	R49	4.8	1.7	No Grass	No Grass	459 Lyell Ave	Cameron St	133
3:37	153	Street Light	31	36.3	29.2	35.6	24	Lee Rd	Ridgeway Ave	134
3:41	154	Traffic Signal	n/a	34.1	30.8	30.9	19.6	Lee Rd	Ridgeway Ave	135
3:45	152	Street Light	n/a	33.4	27.3	33.4	27.3	Latona RD-NWC	Ridgeway Ave	136
3:50	151	Street Light	32	34.2	30.9	31.9	25.1	Latona RD-NWC	Ridgeway Ave	137
4:07	155	Street light	9	1.1	1.1	0.8	0.4	Lancaster St	Dewain St	138
4:19	156	Street Light	38	1.7	1.7	1.5	1.2	Emerson St	Lee Rd	139
4:24	157	Street Light	115	2.3	2.2	2.1	1.8	Lexington Ave	Lee Rd	140
4:28	158	Street Light	113	2.3	1.5	2.3	1.5	OPP 1748 Lexington Ave	Lee Rd	141
4:31	159	Street Light	114	2.2	1.7	2.2	1.7	Lexington Ave	Lee Rd	142
4:36	160	Street Light	116	2.6	2.1	2.6	2.1	Lexington Ave	Lee Rd	143
4:38	161	Street light	120M	1.7	1.1	1.7	1.1	Lexington Ave	Lee Rd	144
4:40	162	Street Light	119M	1.4	1	1.4	1	Lexington Ave	Lee Rd	145
4:51	163	Traffic Signal	95	1.5	1.4	1.1	0.8	Dewey Ave	Alameda St	146
4:52	164	Traffic Control Box	n/a	1.4	1.3	1.1	1.8	Dewey Ave	Alameda St	147
5:06	40	Street Light	7	1.4	1.3	1.4	1.3	Lyndhurst St	North St	148
5:09	41	Street Light	5	3.2	3.2	3.2	3.2	Lyndhurst St	North St	149
5:17	42	Street Light	60	21.9	20.4	21.9	20.4	850 Hudson Ave	Herald St	150
5:27	44	Street Light	n/a	5.7	3.6	5.7	3.6	St Paul St	Collingwood Dr	151
5:30	43	Street Light	175	5.2	4.1	5.2	4.1	St Paul St	Collingwood Dr	152
5:41	165	Street Light	61	1.7	1.3	No Grass	No Grass	OPP 428 State St	Brown St	153

Date/Time	Event ID	Structure	Structure ID	Voltage	V Shunt	Voltage	V Shunt	Address	Cross Street	Photo #
5:46	166	Street Light	59	1.4	0.9	1.4	0.9	OPP 412 State St	Brown St	154
5:49	167	Street Light	57	1.3	1.2	1.3	1.2	State St	Brown St	155
5:50	168	Traffic Signal	n/a	1.3	1.1	1.3	1.1	State St-NWC	Brown St	156
5:52	169	Traffic Signal	55	1.5	1.4	1.5	1.4	State St-SWC	Brown St	157
5:55	171	Traffic Control Box	n/a	1	1	1	1	State St-SWC	Brown St	158
5:57	170	Street Light	n/a	1	1	1	1	State St-SEC	Brown St	159
6:00	172	Ped X-Ing	58	1.5	1.5	1.5	1.5	State St-SEC	Brown St	160
6:12	173	Traffic Signal	7R	4.3	4.3	4.3	4.3	Jay St-SEC	N Plymouth Ave	161
6:14	174	Traffic Control Box	n/a	1.8	1.8	1.8	1.8	Jay St-SEC	N Plymouth Ave	162
29-Dec										
5:24	175	Street Light	31	4.8	2	4.8	2	367 Orchard St	Riley Pl	163
5:27	176	Street Light	28	3.9	3.2	3.4	1.5	OPP 349 Orchard St	Riley Pl	164
5:42	177	Street Light	83	2.9	2.8	1.7	1.1	N Plymouth Ave	Lorimer St	165
5:45	178	Street Light	9	2.5	2.5	1.7	1	N Plymouth Ave	Lorimer St	166
5:48	179	Street Light	11	1.7	1	1.7	1	OPP 52 Lorimer St	N Plymouth Ave	167
6:15	180	Street Light	240R	3.7	2.9	3.7	2.9	Lake Ave	Winchester St	168
6:17	182	Street Light	248R	1.6	1.1	1.6	1.1	Lake Ave	Winchester St	169
6:19	181	Street Light	250R	1.3	1	1.3	1	Lake Ave	Winchester St	170
6:25	183	Street Light	171	1.2	1.1	1.2	1.1	Lake Ave	Seneca PKWY	171
6:27	169	Street Light	169	1.2	1	1.2	1	Lake Ave	Keehl St	172
6:31	185	Street Light	7	1.4	0.5	1.4	0.5	67 Redwood Rd	Lake Ave	173
6:35	186	Street Light	8	2.7	1	2.7	1	OPP 93 Redwood RD	Lake Ave	174
6:38	187	Street Light	9	4.7	4.7	2.9	1.3	101 Redwood RD	Lake Ave	175
6:41	188	Street Light	10	2	1.2	1.8	1.8	124 Redwood RD	Lake Ave	176
6:45	189	Street Light	11	4.3	3.9	2.7	1.8	145 Redwood RD	Lake Ave	177
6:48	190	Ped X-Ing	n/a	6.8	5.8	2.7	2.2	Maplewood DR-SWC	Redwood RD	178
6:52	191	Street Light	12	6.5	5.1	6.1	1.4	Redwood RD	Maplewood DR	179
6:55	192	Traffic Signal	n/a	4.3	2	4.3	2	Maplewood DR-NEC	Redwood RD	180
6:58	193	Traffic Control Box	n/a	4.1	2.1	4.1	2.1	Maplewood DR-NEC	Redwood RD	181
7:18	194	Street Light	31	1.9	1.9	1.9	1.9	St Paul St	Central Ave	182

Date/Time	Event ID	Structure	Structure ID	Voltage	V Shunt	Voltage	V Shunt	Address	Cross Street	Photo #
7:26	195	Street Light	34	1.4	1.3	1.4	1.3	St Paul St	Ward St	183
7:40	196	Street Light	MWB78	11.1	10.8	11.1	10.8	Keeler Expressway	Portland Ave	184
7:43	197	Street Light	WB76M	11.2	11	11.2	11	Keeler Expressway	Portland Ave	185
7:47	198	Street Light	WB74M	11.2	10	11.2	10	Keeler Expressway	Portland Ave	186
8:00	199	Water Cap	n/a	3.5	3.3	3.5	3.3	N Clinton Ave	Collingwood Dr	187
8:05	200	Access Hatch	RGE	11.8	7.1	11.8	7.1	N Clinton Ave	Collingwood Dr	189
8:08	201	Storm Drain	n/a	2.2	1.2	2.2	1.2	Collingwood Dr	N Cliniton Ave	190
8:13	204	Manhole	Sewer MG-PW	2.7	1.9	2.7	1.9	N Clinton Ave	Collingwood Dr	191
8:17	203	Manhole	Sanitary Sewer	3.8	2.1	3.8	2.1	N Clinton Ave	Collingwood Dr	192
8:40	206	Traffic Control Box	51	1.2	0.9	1.2	0.9	N Clinton Ave	Upper Falls BLVD	193
8:48	207	Street Light	20	2.3	1.9	1.8	1.1	228 Martin St	Hartel Ally	194
8:52	208	Street Light	18	3.5	3.5	2	2.2	202 Martin St	Hartel Ally	195
8:55	209	Street Light	MWB78	11.1	10.8	11.1	10.8	Keeler Expressway	Portland Ave	196
9:00	227	Street Light	1	1.8	1.6	1.2	0.8	Martin St	Gorham St	197
9:03	228	Street Light	2	1.9	1.3	1.6	1	Martin St	Gorham St	198
9:05	229	Street Light	3	2.3	1.7	2	1.3	Martin St	Gorham St	199
9:07	230	Street Light	4	2.5	2.1	2.2	1.2	Martin St	Gorham St	200
9:09	231	Street Light	5	2.5	1.9	2.5	1.9	Martin St	Gorham St	201
9:10	232	Street Light	6	3	1.9	2.5	1.3	Martin St	Gorham St	202
9:12	233	Street Light	7	3.6	1.4	2.6	1.9	Martin St	Gorham St	203
9:14	234	Street Light	2	3	1.2	3	1.2	Wrays Aly	Martin St	204
9:16	235	Street Light	3	3.9	3.8	3.9	3.8	Wrays Aly	Martin St	205
9:20	236	Street Light	4	2.7	1.4	2.7	1.4	Wrays Aly	Upper Falls BLVD	206
9:29	210	Street Light	5	2	1.9	2	1.9	449 Hudson Ave	Wadsworth St	207
9:36	211	Traffic Signal	37	1.2	1.1	1.1	0.5	15 Hudson Ave-NWC	North St	208
9:46	212	Street Light	103	1.3	0.9	1.3	0.9	947 Ave D	North St	209
9:51	213	Street Light	107	2.5	2.2	2.5	2.2	OPP 998 Ave D	North St	210
10:01	215	Street Light	1	1.7	1.6	1.3	0.5	N Clinton Ave	Cumberland St	211
10:04	214	Street Light	11	1.8	1.6	1.4	0.5	N Clinton Ave	Cumberland St	212
10:10	237	Street Light	4	2.3	1.4	2.3	1.4	Nassau St	Ormond St	213
10:12	238	Street Light	2	2.8	2.5	2.3	1.8	Nassau St	Joseph Ave	214
10:20	242	Street light	17	2.5	2.4	2.5	2.4	425 Ormond St	Nassau St	215
10:33	216	Street Light	n/a	2.8	1.5	2.6	1.1	Delevan St	North St	216
10:35	217	Street Light	5	2.7	1.4	2.2	1.3	Delevan St	North St	217
10:40	218	Street Light	9	1.1	1	1.1	1	Delevan St	Gibbs St	218
10:42	220	Street Light	12	1.9	1.3	1.9	1.3	Delevan St	Scio St	219
10:45	219	Street Light	M86A	2.3	1.1	2.3	1.1	Delevan St	Scio St	220
12:05	225	Traffic Signal	n/a	9	8.8	9	8.8	Scio St	University Ave	221
12:07	224	Traffic Signal	n/a	8.2	7.3	8.2	7.3	Scio St	University Ave	222
12:08	223	Lamp Post	n/a	1.4	1.1	1.4	1.1	Scio St	University Ave	223

Date/Time	Event ID	Structure	Structure ID	Voltage	V Shunt	Voltage	V Shunt	Address	Cross Street	Photo #
12:09	222	Traffic Control Box	n/a	7.3	5.2	7.3	5.2	Scio St	University Ave	224
12:10	221	Traffic Signal	9.2	9.4	9.3	5.2	2.1	Scio St	University Ave	225
12:23	226	Street Light	12	2.1	1.5	2.1	1.5	132 Franklin st	Andrews St	226
12:32	240	Street Light	1	2.7	2.6	2.2	1.3	Ward St	St Paul St	227
12:40	239	Street Light	62	1	0.8	1	0.8	428 State St	Brown St	228
12:56	45	Street Light	10	33	1.8	3.3	1.8	106 Furlong St	Michell St	229
12:57	46	Street Light	9	3.7	2.2	3.5	1.5	91 Furlong St	Michell St	230
12:59	47	Street Light	8	3.6	3.8	3	1.2	80 Furlong St	Michell St	231
1:00	48	Street Light	7	3.1	1.6	3.1	1.6	63 Furlong St	Mitchell St	232
1:02	49	Street Light	6	2.8	2.1	2	1.7	54 Furlong St	Mitchell St	233
1:03	50	Street Light	5	2.7	2.7	2	1	37 Furlong St	Mitchell St	234
1:06	52	Street Light	4	1.8	1	1.8	1	28 Furlong St	Mitchell St	235
1:19	246	Street Light	135	0.7	0.4	0.7	0.4	1129 E Main St	Minges Aly	236
1:25	262	Street Light	16	2.4	1.4	2	1.1	1344 E Main St	Mustard St	237
1:30	259	Street Light	38	1.8	1	1.8	1	460 Goodman St	E Main St	238
1:35	256	Street Light	46	2.3	2.3	1.8	1.2	614 Hayward Ave	Hayward Ave	239
1:41	255	Street Light	7	1.1	0.6	1.1	0.5	59 Chamberlain St	Hayward Ave	240
1:45	254	Street Light	5	1.7	1.6	1.7	1.6	OPP 46 Chamberlain St	Hayward Ave	241
1:52	247	Street Light	32	2.7	1.6	2.1	1.4	544 Parsells Ave	Greenlyey St	242
1:55	249	Street Light	28	1.3	1	1.3	1	468 Parsells Ave	Greenlyey St	243
1:57	250	Street Light	24	1.9	0.9	1.9	0.9	400 Parsells Ave	Denver St	244
2:02	251	Street Light	18	1.7	1.1	1.7	1.1	290 Parsells Ave	Stout St	245
2:05	252	Street Light	16	2.5	1.1	2.5	1.1	248 Parsells Ave	Denver St	246
2:10	253	Street Light	6	1.5	1.4	1.5	1.4	90 Parsells Ave	Baldwin St	247
2:13	257	Street Light	20	1.4	1.3	1	0.5	Denver St	Rosewood Ter	248
2:35	261	Street Light	83R	6.1	5.5	4.9	2.6	1095 Portland Ave	Pomeroy St	249
2:40	260	Street Light	82R	4.6	2.8	4.6	2.8	1080 Portland Ave	Furlong St	250
2:52	263	Street Light	40	2.8	2.2	2.9	1.3	542 Hayward Ave	Beechwood St	251
3:15	264	Street Light	285	3.5	3	2.5	1.6	2899 Lake Ave	Wyndham Rd	252
3:20	265	Street Light	275	1.5	1	1.5	1	2615	Burley Rd	253
3:23	266	Traffic Control Box	n/a	1.6	1.6	1.6	0.5	2575 Lake Ave	Burley Rd	254
3:25	267	Street Light	273R	1.8	1.1	1.8	1.1	2573 Lake Ave	Burley Rd	255